



In this user manual we have tried to describe the matters concerning the operation of this CNC system to the greatest extent. However, it is impossible to give particular descriptions for all unnecessary or unallowable operations due to length limitation and products application conditions; Therefore, the items not presented herein should be regarded as " impossible " or " unallowable " .



Copyright is reserved to GSK CNC Equipment Co., Ltd. It is illegal for any organization or individual to publish or reprint this manual. GSK CNC Equipment Co., Ltd. reserves the right to ascertain their legal liability.

Preface

Your Excellency,

We are honored by your purchase of this GSK 983Ma Milling CNC System made by GSK CNC Equipment Co., Ltd.

Warning



Accident may occur by improper connection and operation ! This system can only be operated by authorized and qualified personnel.

Please read this manual and a manual from machine tool builder carefully before installation, programming and operation, and strictly observe the requirements. Otherwise, products and machine may be damaged, workpiece be scrapped or the user be injured.

Safety Responsibility

Manufacturer's Responsibility

- Be responsible for the danger which should be eliminated and/or controlled on design and configuration of the provided CNC systems and accessories.
- Be responsible for the safety of the provided CNC systems and accessories.
- Be responsible for the provided information and advice for the users.

User's Responsibility

- Be trained with the safety operation of CNC system and familiar with the safety operation procedures.
- Be responsible for the dangers caused by adding, changing or altering to the original CNC systems and the accessories.
- Be responsible for the failure to observe the provisions for operation, adjustment, maintenance, installation and storage in the manual.

This manual is reserved by end user.

We are full of heartfelt gratitude to you for supporting us in the use of GSK's products.

Contents

Precautions	1
1. NC Unit Interfaces	3
2. Interconnect Block Diagram	4
3. Connection between NC Unit and GS2000T-CA1 Drive Unit.....	5
(without brake)	5
4. Connection between NC Unit and GS2000T-CA1 Drive Unit.....	6
(with brake)	6
5. Full closed-loop connection with Grating Ruler	7
6. Connection between NC Unit and DAP03 Spindle Servo Drive Unit	8
7. Connection between NC Unit and GS3000Y-NP2 Spindle Servo Drive Unit.....	9
8. Connection between NC Unit and Spindle Inverter	10
9. Machine Tool Operation Panel	11
10. Connection between NC Unit and Operation Panel	12
11. Connection between external MPG and Operation Panel.....	13
12. Connection between NC Unit and PC	14
13. Connection Method for Brake and System Power-on Control	15
14. Connection between NC Unit and I/O Unit	16
15. General of External I/O Unit (X1) Interfaces.....	17
16. Connectivity Diagrams for I/O Unit (X1) Input/Output Signals	18
17. I/O Points Definition (X1)	19
Appendix 1 Installation Dimension Drawings	23
Appendix 2 Connection between NC Unit and DA98D Drive Unit (obsolete product)	28
GSK983Ta-H/ GSK983Ta- V Turning CNC System Connection Manual	30
Version Upgrading Records	30

Precautions

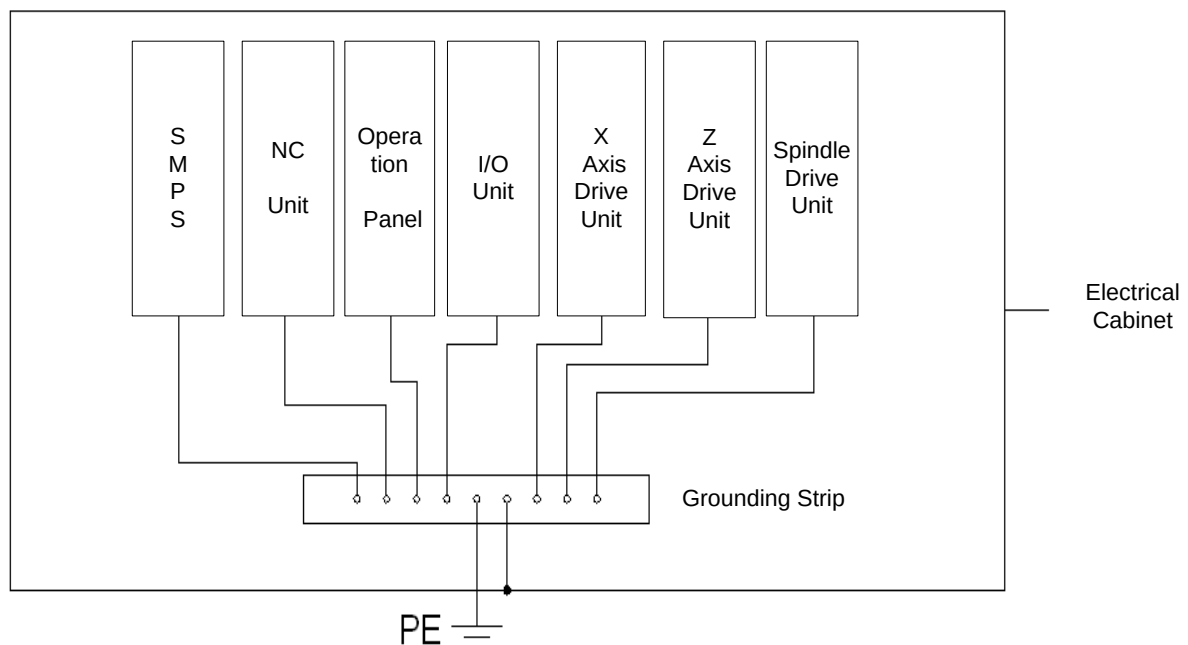
- 1、The system-matched power supply box is exclusive for GSK 983Ma.Do not supply this power to other devices(such as bake and magnetic valve);otherwise, serious danger may occur !

2、Requirements for electrical cabinet

The electrical cabinet adopts full-enclosed structure and dustproof design. The temperature difference between outside and inside of the cabinet should be less than 10℃; or, a heat-exchange system should be installed. The ambient temperature should not exceed 45℃. Prevent the entry of dust, coolant and organic solution.

3、Grounding

The cabinet should be protectively grounded, and the continuity should meet the requirement GB5226.1-2002. Well grounding is the essential condition for a stable operation. The grounding wires of different parts cannot be connected with each other in series. The grounding strip whose thickness not less than 3mm should be installed in the cabinet, the protective grounding terminals should be connected to grounding strip with yellow-green wires independently, and when the grounding strip is connected with the ground, its grounding resistance should be less than 4Ω.

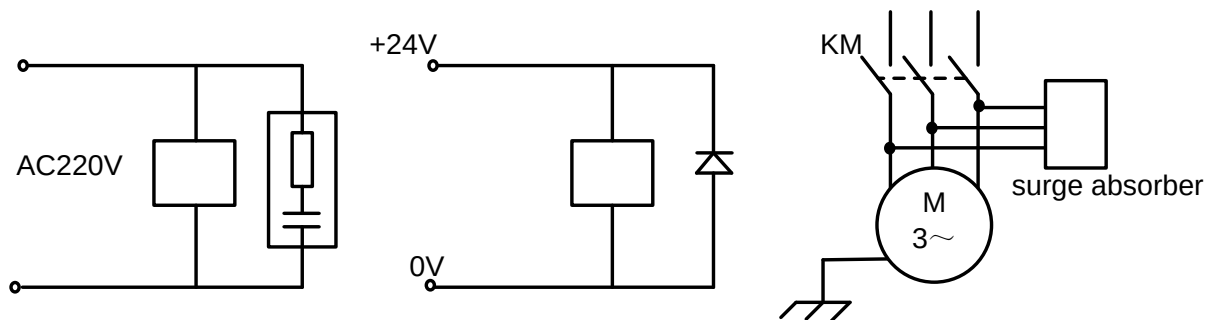


- 4、The system power should be supplied through isolation transformer
- 5、Wiring

The joints between wires and the system or drive unit should be tight and firm. The low-current type wires such as signal wires and control wires should be laid far away from heavy current and electromagnetic interference, and be arranged in an uncurled manner as far as possible, because winding annularly could easily cause the acquisition of interference signal..

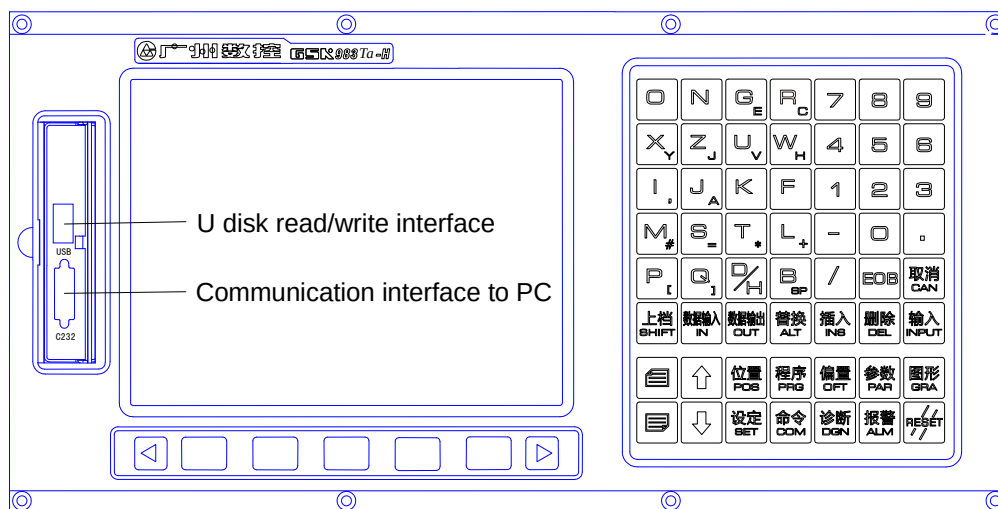
6、Interference suppression

Connect the RC circuits at the two ends of AC coil in parallel. The RC circuits should be closed to inductive load as far as possible. Connect FWD at the ends of DC coil reversely in parallel. Connect the surge absorber at the winding head of AC motor.

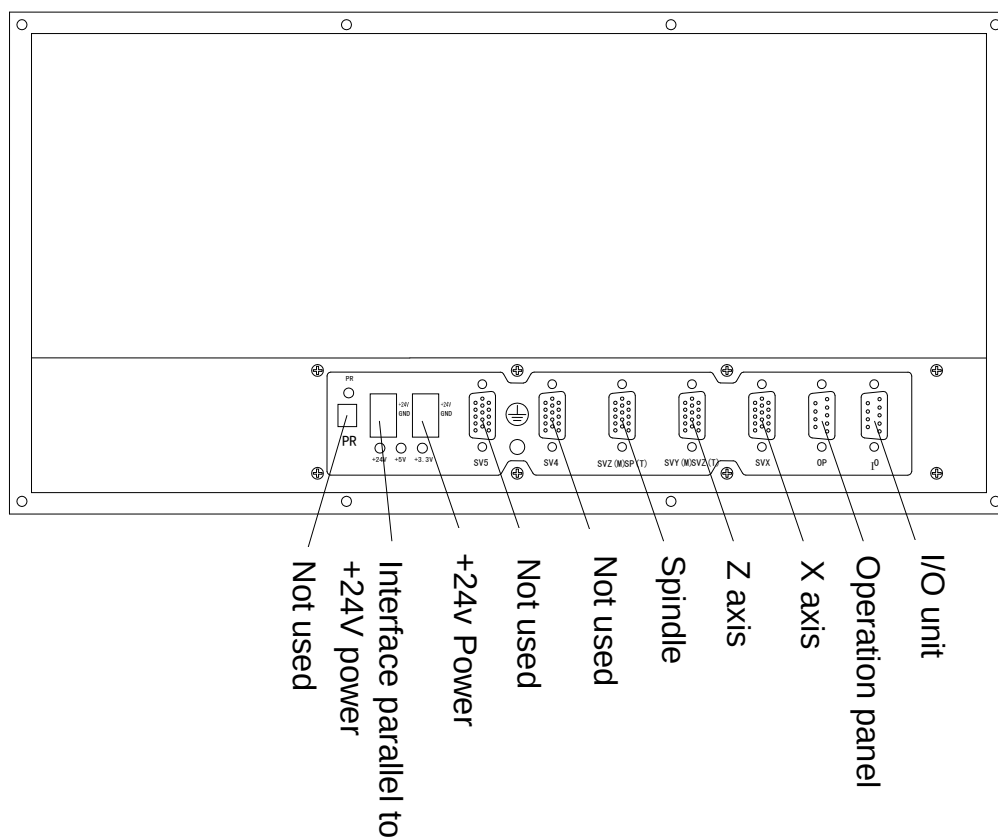


1. NC Unit Interfaces

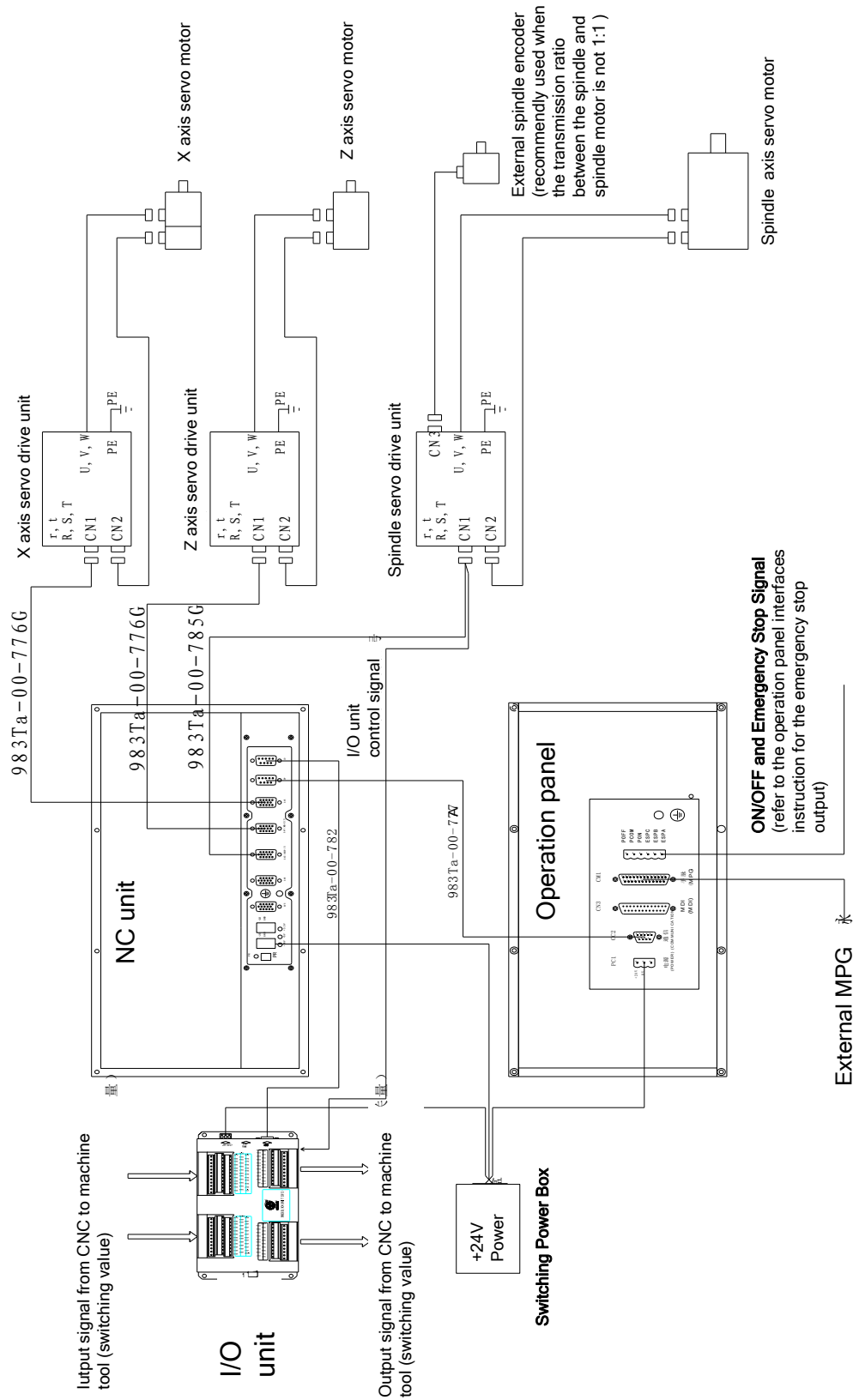
Front View



Back View

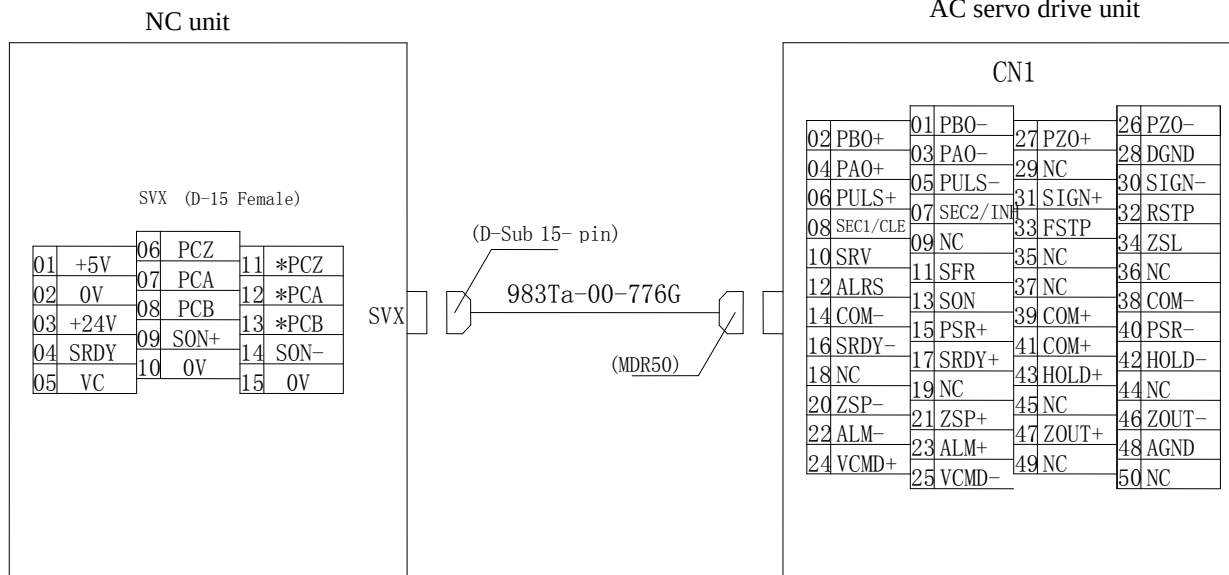


2. Interconnect Block Diagram

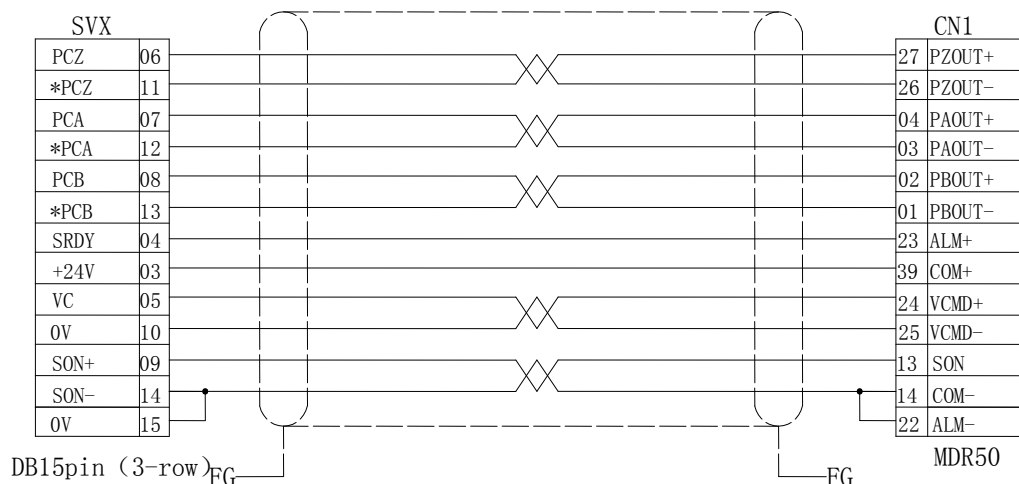


3. Connection between NC Unit and GS2000T-CA1 Drive Unit (without brake)

GS2000T suffixing with C(CAN bus)
AC servo drive unit



Without brake 983Ta-00-776G



PCA *PCA: Encoder feedback A phase differential signal (pulse signal, drive unit→NC)

PCB *PCB: Encoder feedback B phase differential signal (pulse signal, drive unit→NC)

PCZ *PCZ: Encoder feedback Z phase differential signal (pulse signal, drive unit→NC)

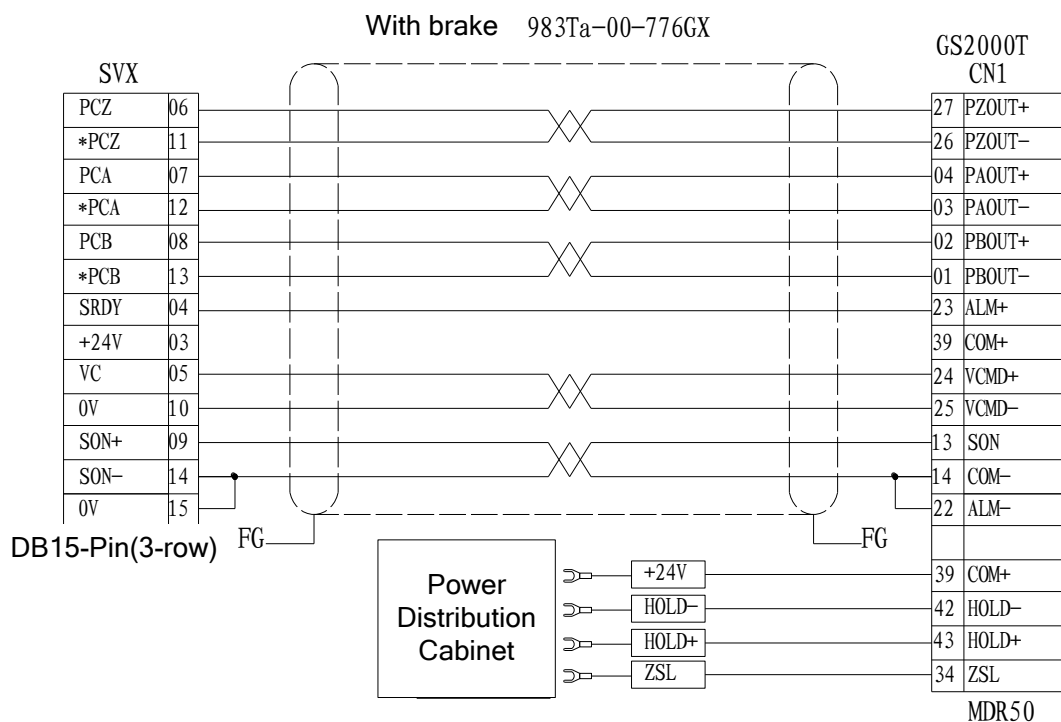
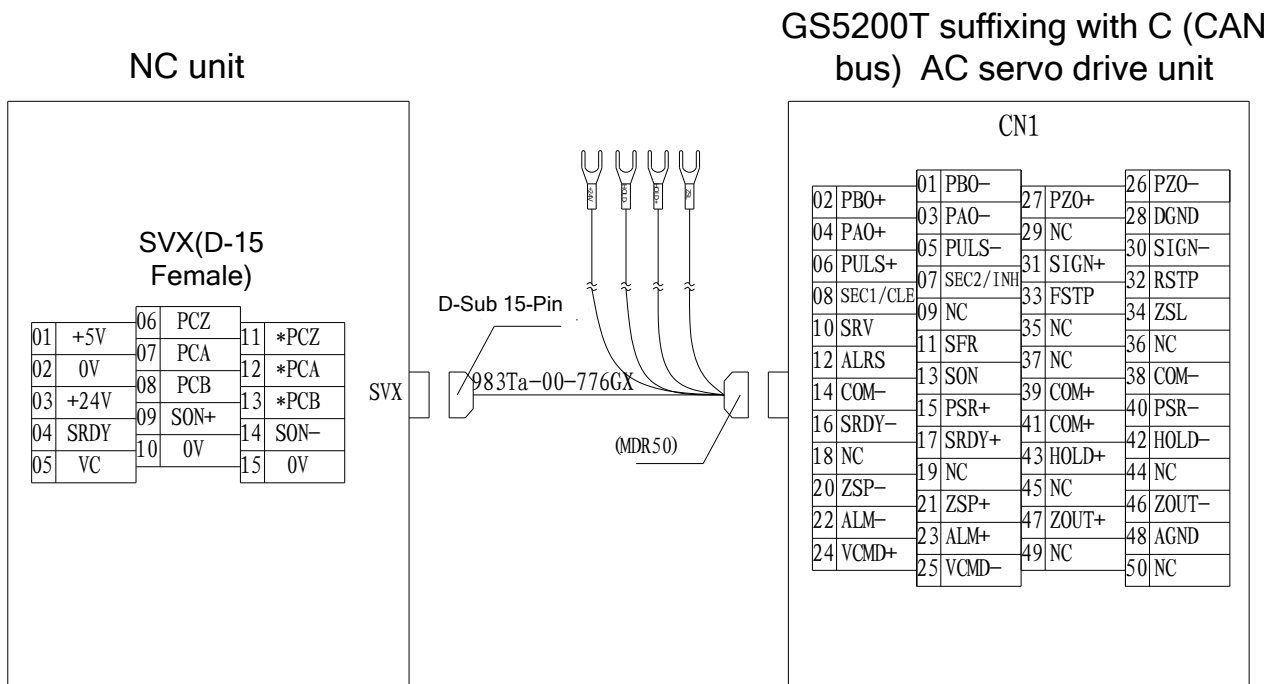
SON+/-: Enable signal (binary signal, NC→ drive unit)

SRDY: Servo drive ready signal (binary signal, drive unit→NC)

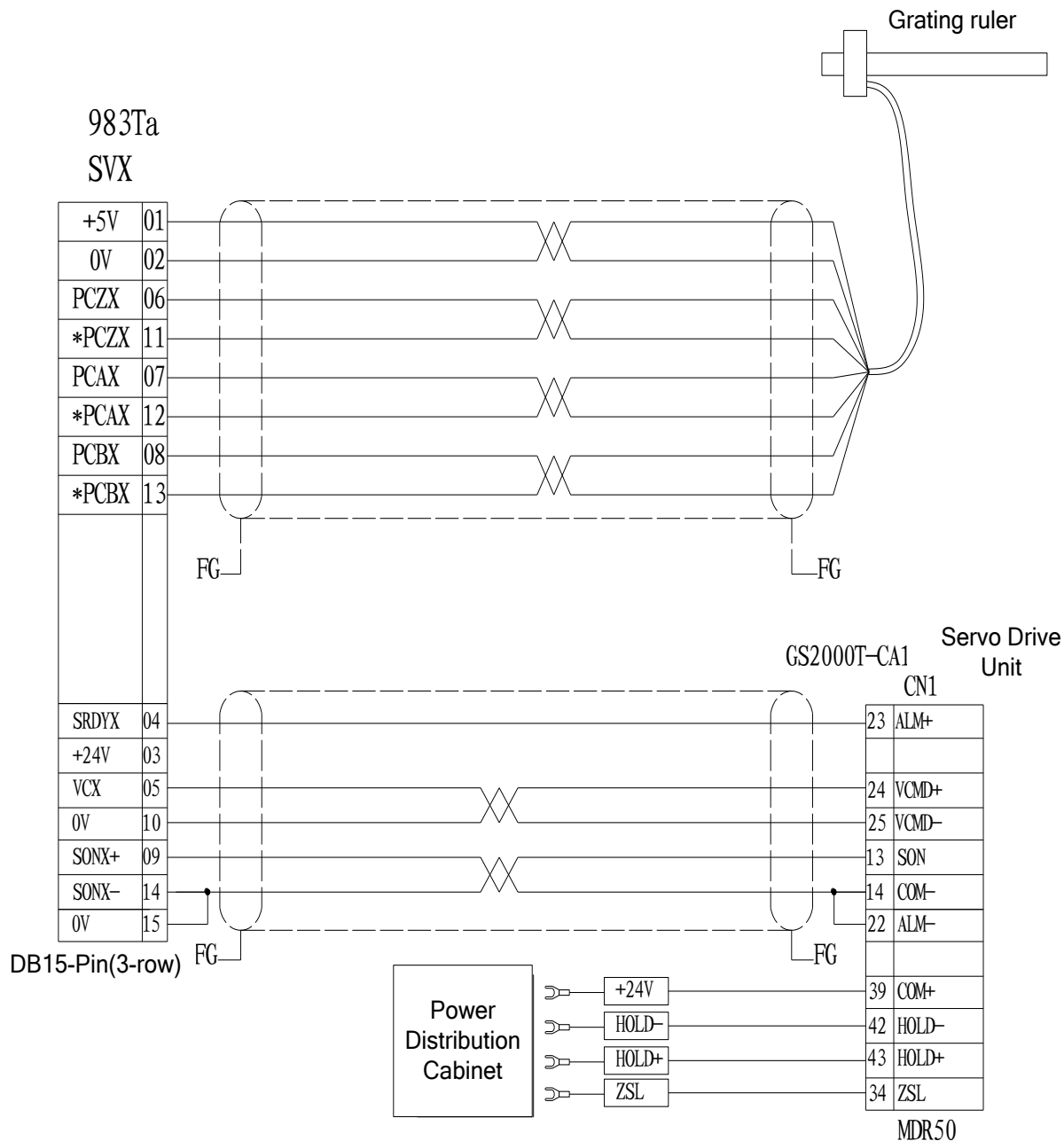
VC: Speed control voltage (direct current, NC→drive unit)

Note : when the X axis is connected without brake, the connection of X or Z axis is the same. The X axis connection with brake is shown in the following page.

4. Connection between NC Unit and GS2000T-CA1 Drive Unit (with brake)



5. Full closed-loop connection with Grating Ruler



6. Connection between NC Unit and DAP03 Spindle Servo Drive

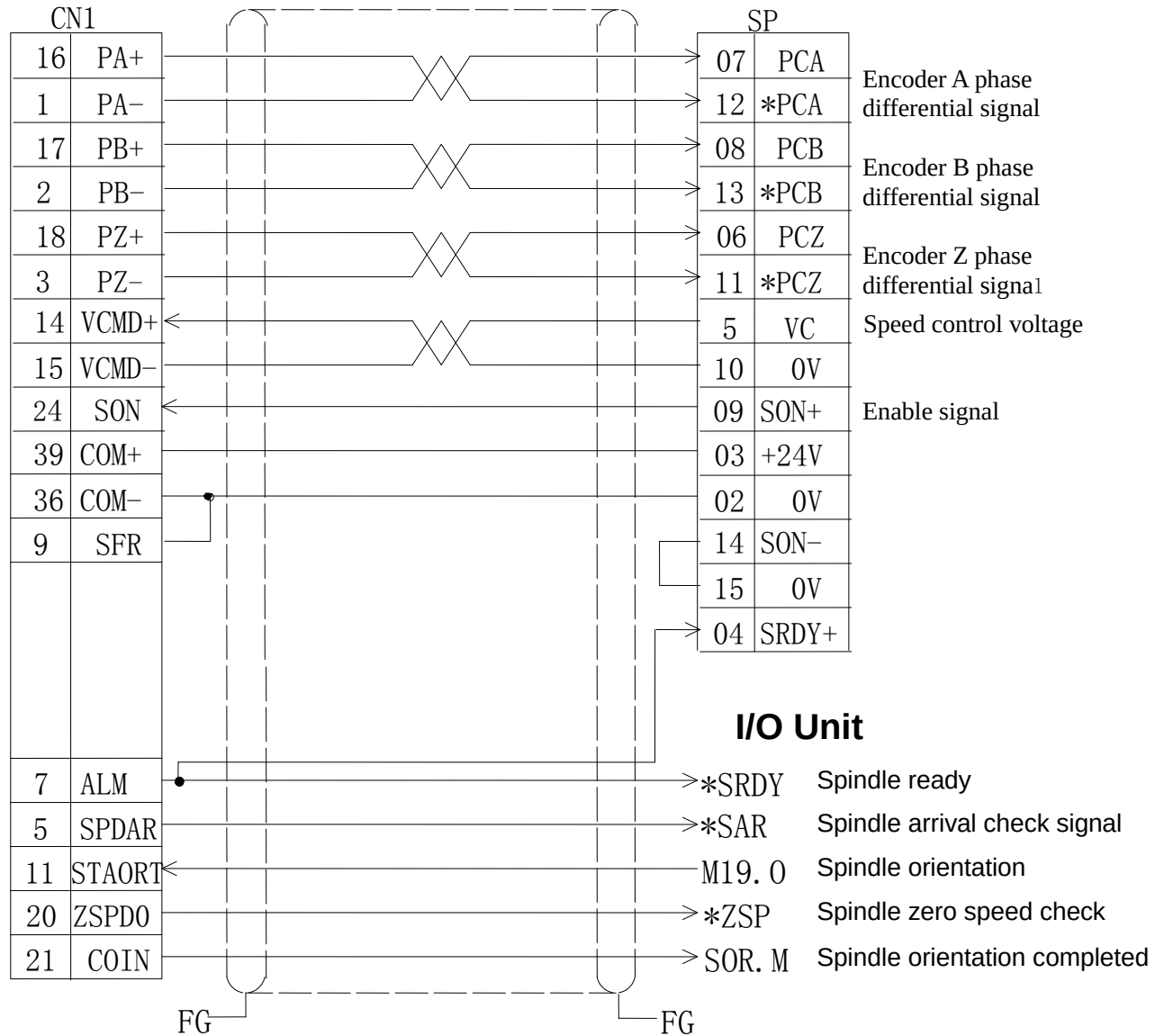
Unit

Spindle Servo Drive Unit:

DAP01or DAP03

983Ta-00-785

NC Unit



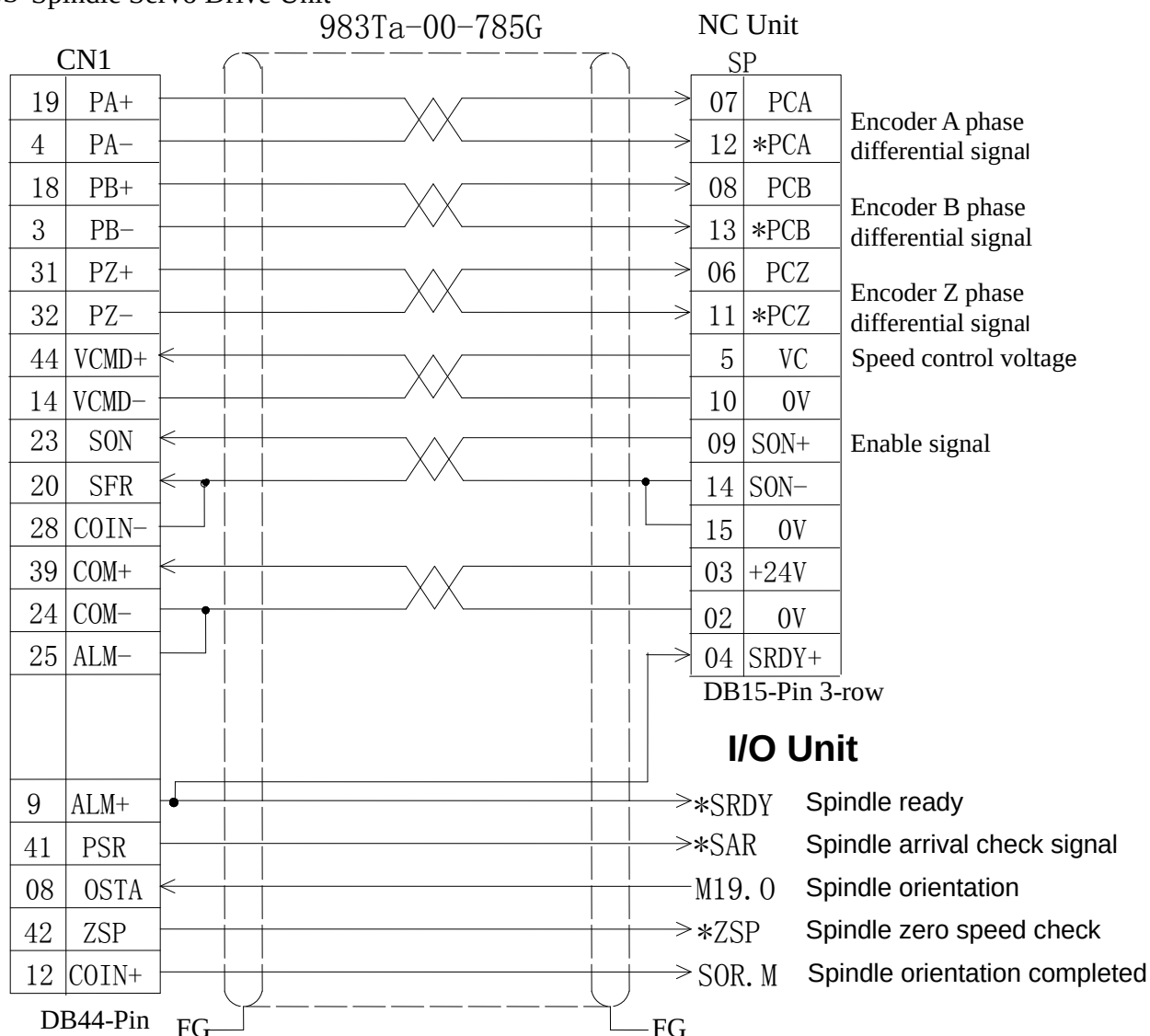
Note: The corresponding positions of I/O Unit are described in PLC User Manual of the same version.

7. Connection between NC Unit and GS3000Y-NP2 Spindle Servo

Drive Unit

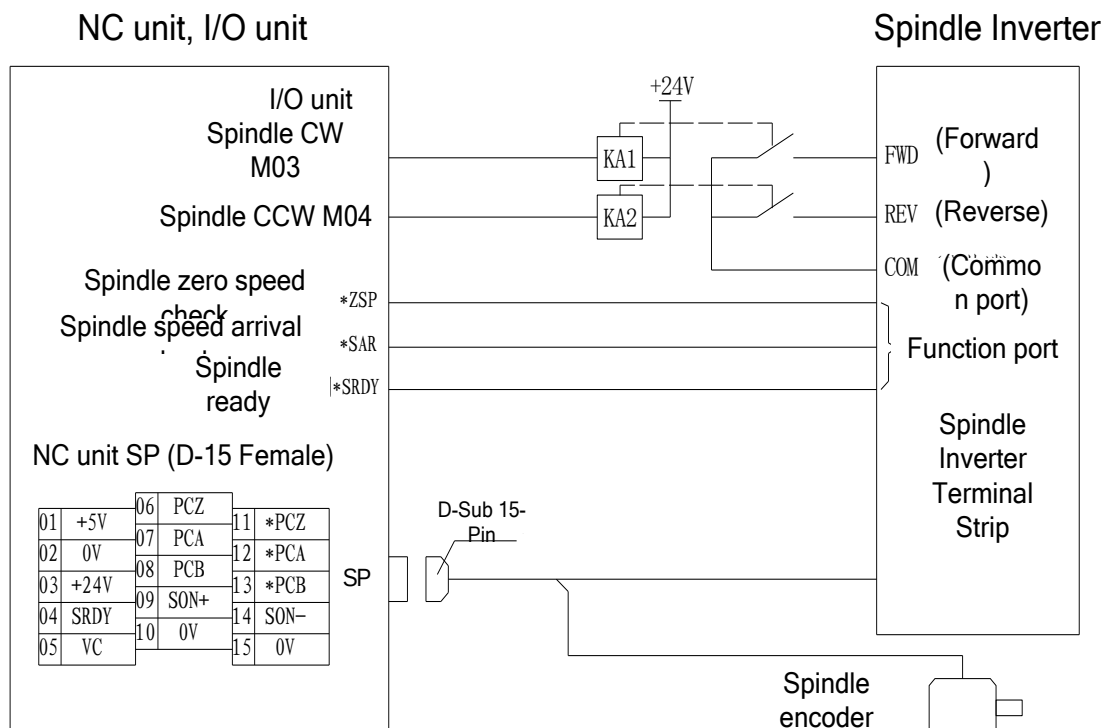
Suffixing with N (no-bus)

GS Spindle Servo Drive Unit



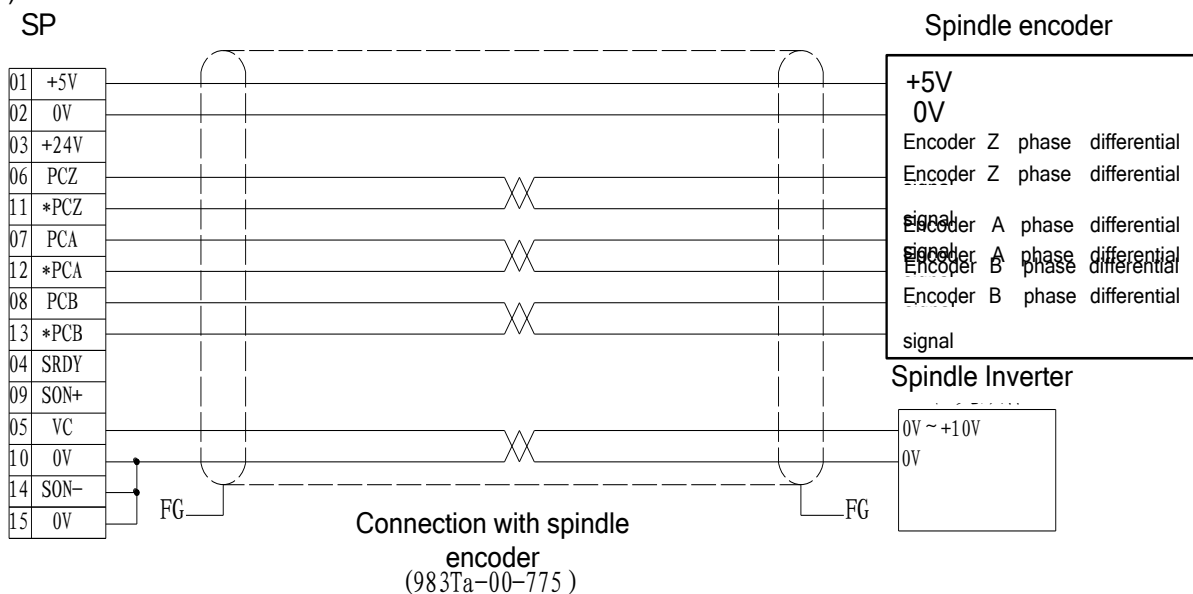
Note: The corresponding positions of I/O Unit are described in PLC User Manual of the same version.

8. Connection between NC Unit and Spindle Inverter

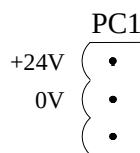
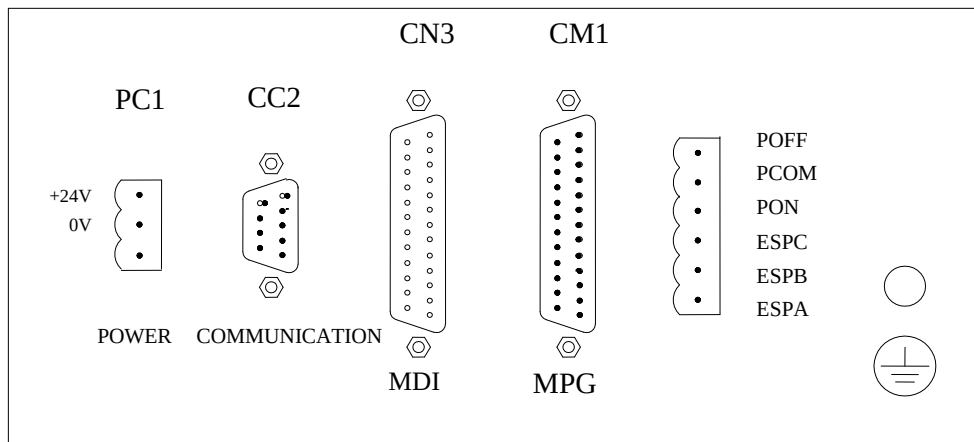


Note 1: The corresponding positions of I/O Unit such as M03 and M04 are described in PLC User Manual of the same version.

Note 2: When the spindle speed arrival check signal *SAR is not used, it should be shorted to 0V (valid when the input interface is at low level) or be shorted to 24V (valid when the input interface is at high level).



9. Machine Tool Operation Panel



- POFF (Power off)
- PCOM (Power switch common port)
- PON (Power on)
- ESPC (Emergency stop chain leading-out terminal2)
- ESPB (Emergency stop button on operation panel leading-out terminal2)
- ESPA (Emergency stop button on operation panel leading-out terminal1; Emergency stop chain leading-out terminal 1)

CC2 (D-9 male)			
01	0V	06	TD-
02	TD+	07	RD-
03	RD+	08	HA-
04	HA+	09	HB-
05	HB+		

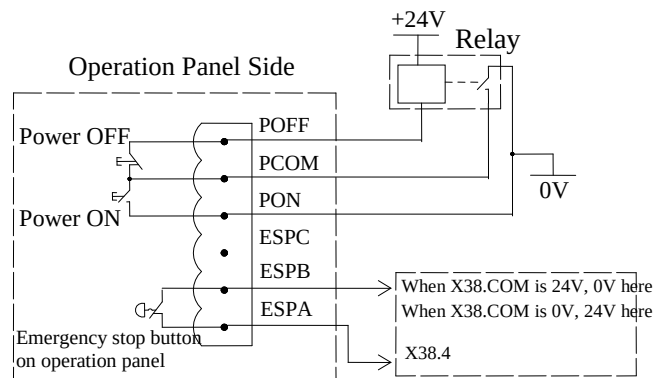
Communication

CN3(D-25 Female) is not used

CM1 (D-25male)			
01	HX	14	
02	HZ	15	
03		16	×1
04	×10	17	×100
05	+L (24V)	18	-L (0V)
06	ESP2	19	ESP1
07		20	0V
08	HA+	21	HA-
09	HB+	22	HB-
10	0V	23	
11	0V	24	
12	+5V	25	
13	+5V		

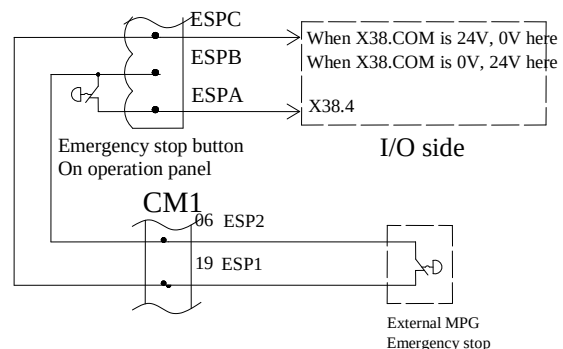
MPG

Note: External MPG and MPG on the operation panel cannot use at the same time.



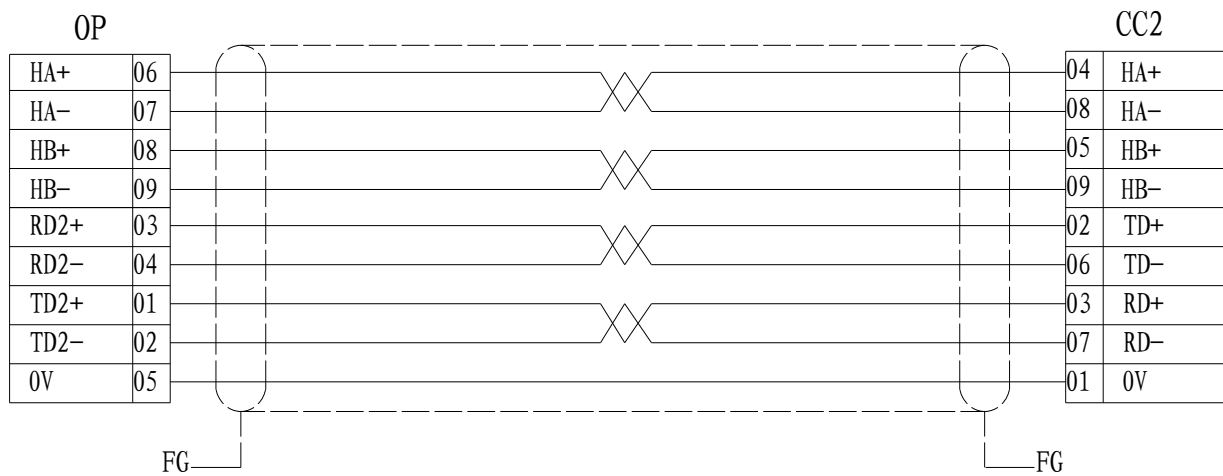
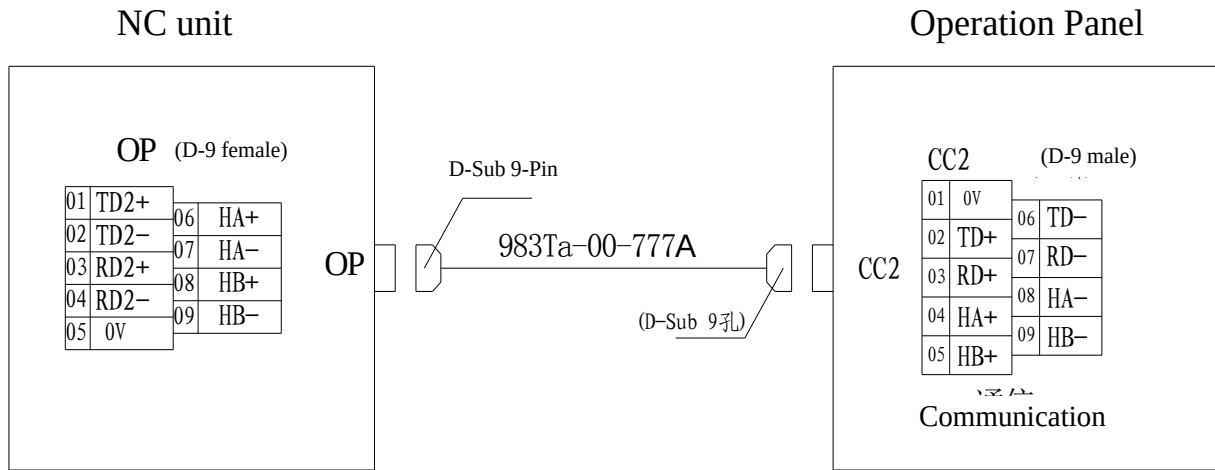
I/O unit side

Note: when external MPG is used, emergency stop chain should be formed by emergency stop buttons on operation panel and external MPG



External MPG
Emergency stop

10. Connection between NC Unit and Operation Panel



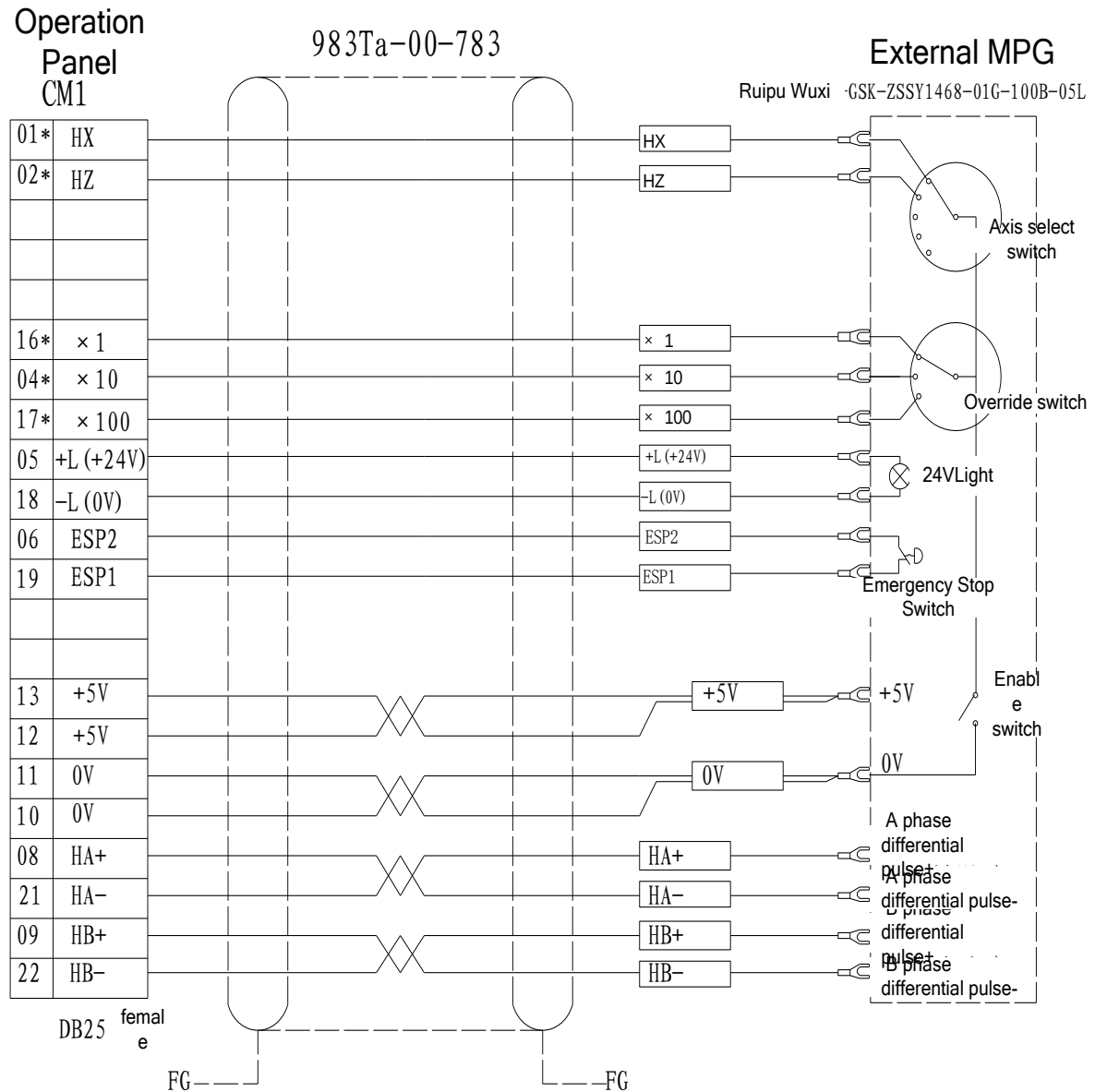
RD2+ RD2-: RS422 differential receive terminal

TD2+ TD2-: RS422 differential sending terminal

HA+ HA- : MPG A phase pulse input

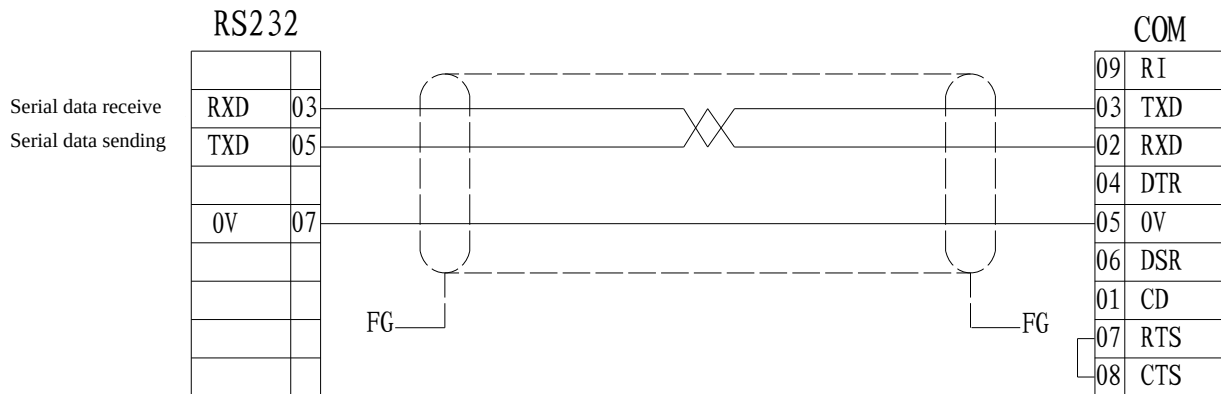
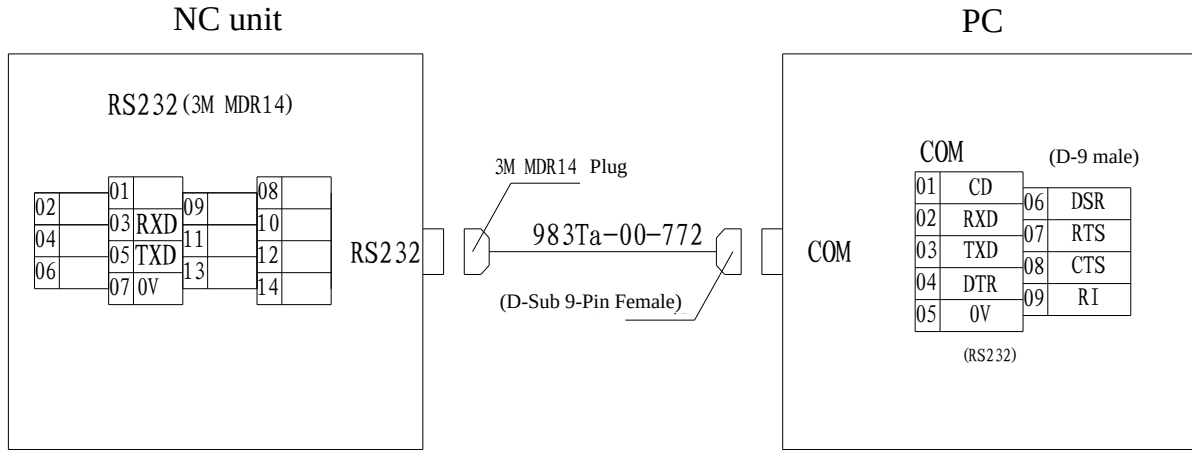
HB+ HB- : MPG B phase pulse input

11. Connection between external MPG and Operation Panel



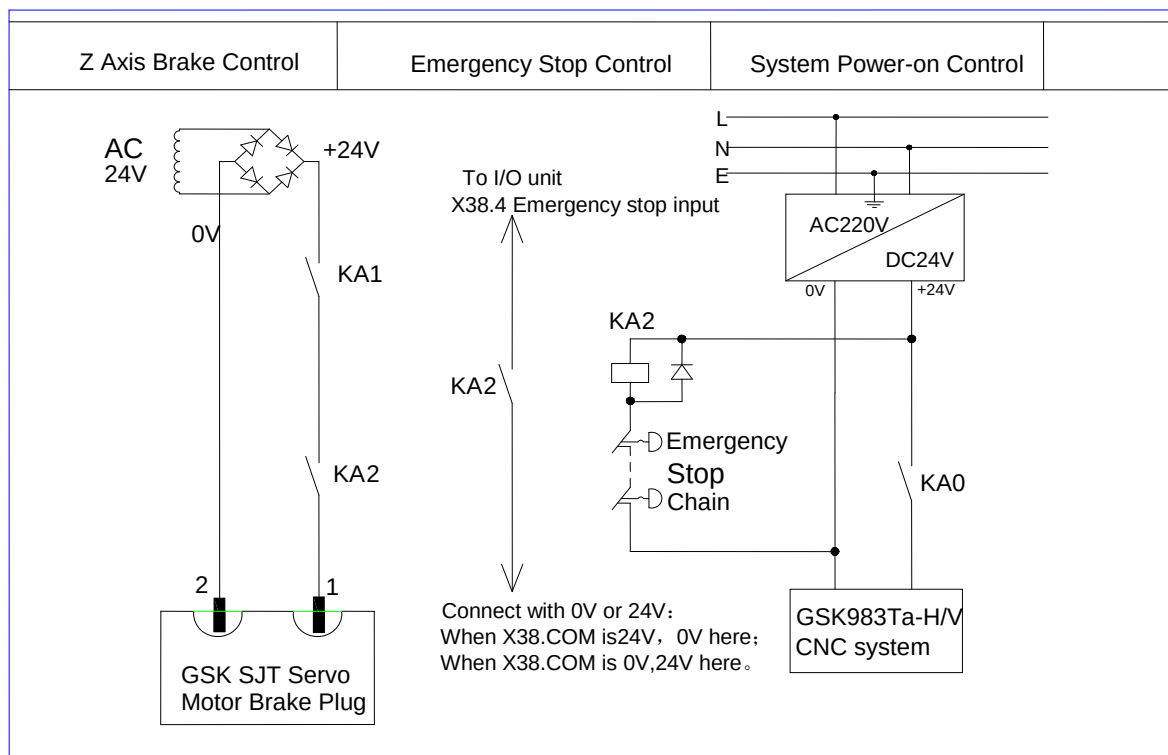
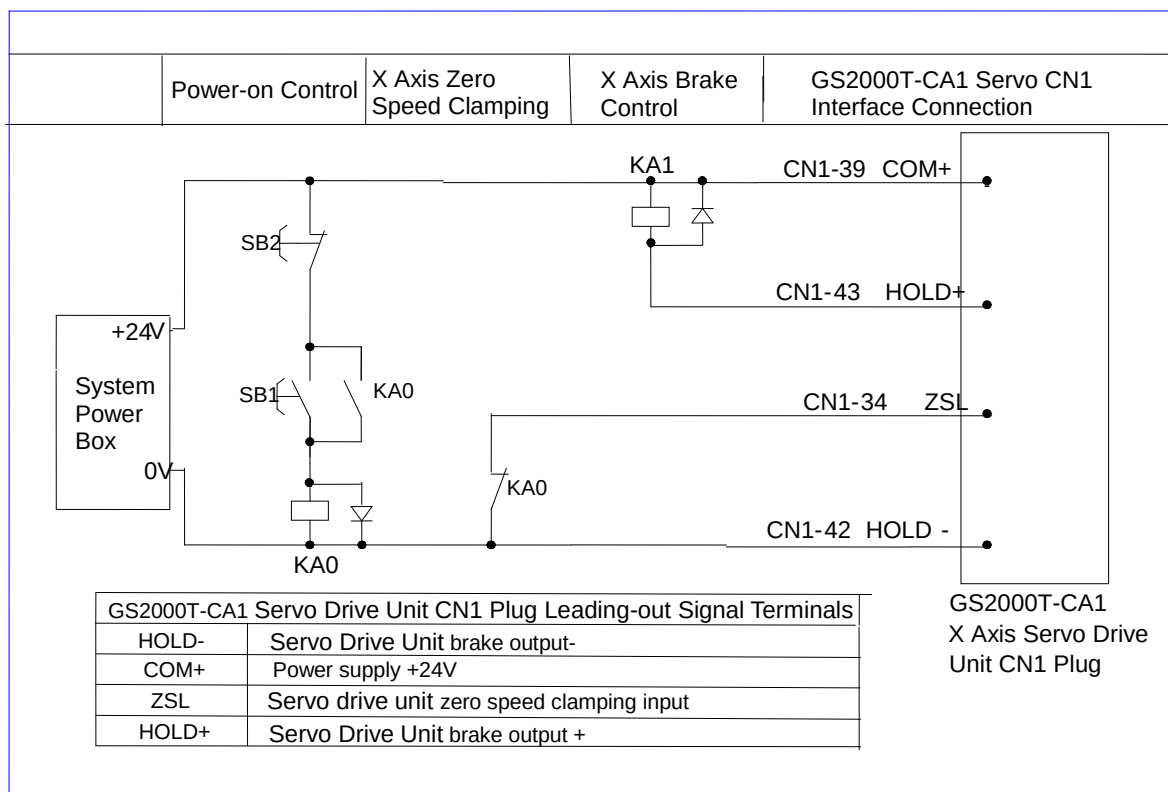
*Note: axis select signals HX,HZ of CM1 and override signals ×1,×10,×100 of pin No. are defined by PLC, and pin No. can be different in different versions of PLC. So, check the operations of the corresponding PLC before connecting.

12. Connection between NC Unit and PC

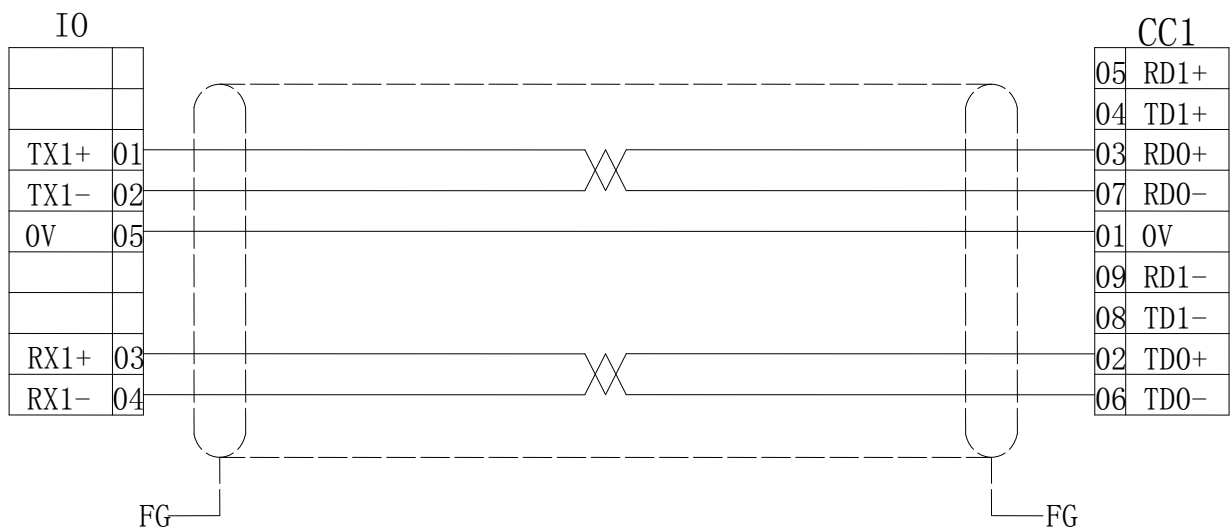
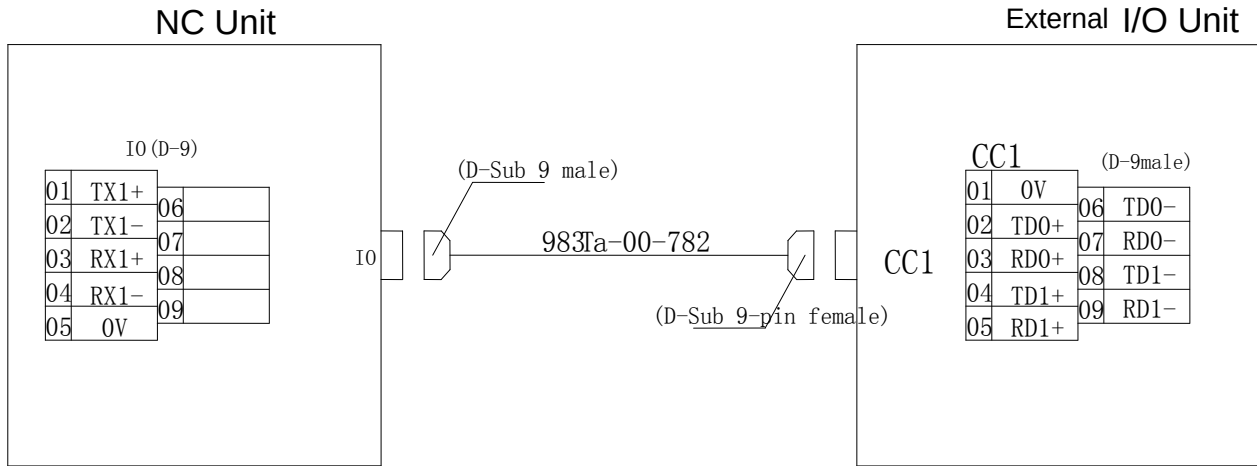


Note: the shell of NC and PC should be grounded firmly.

13. Connection Method for Brake and System Power-on Control



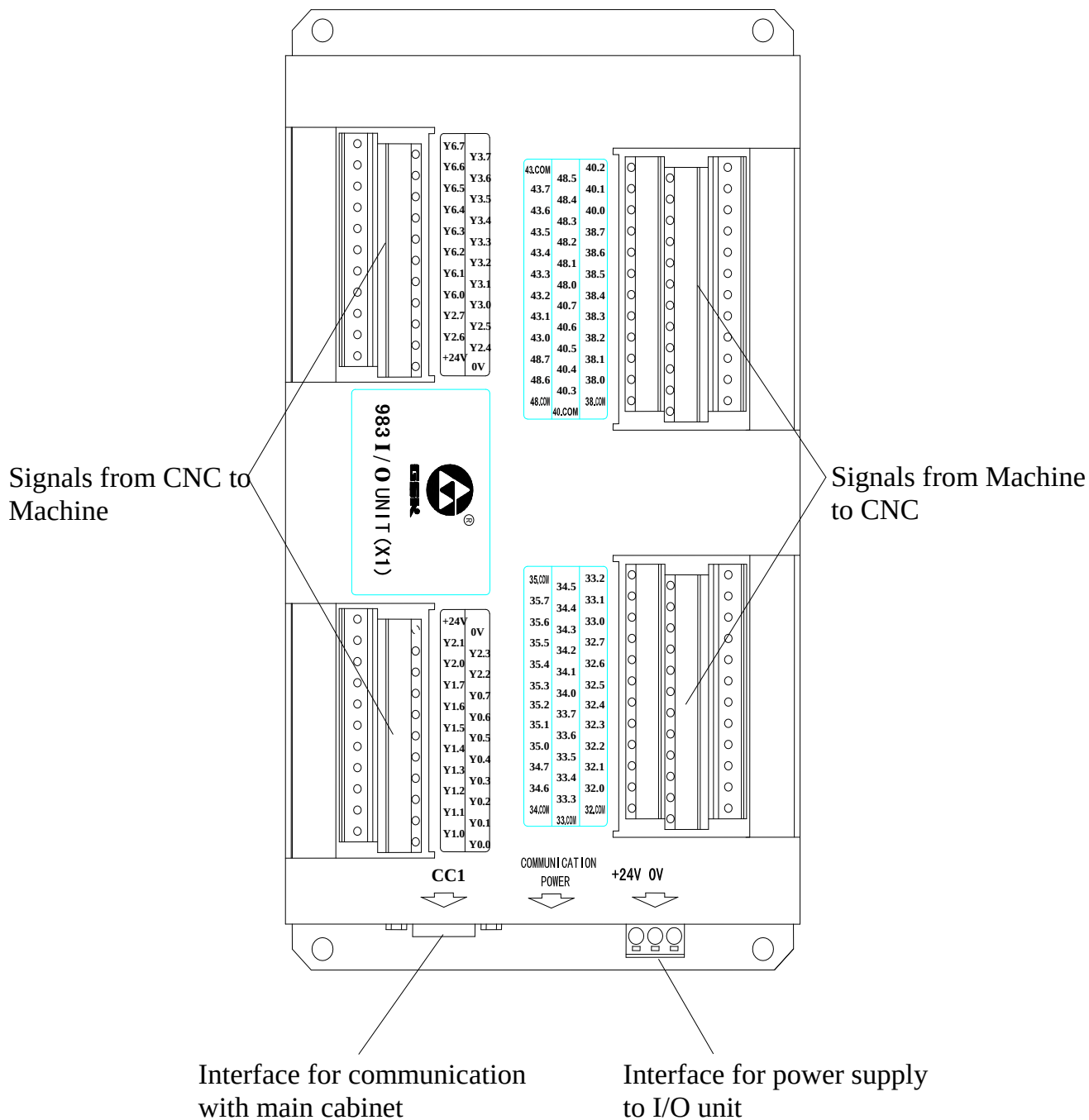
14. Connection between NC Unit and I/O Unit



TX1+、TX1-: RS422 differential signal sending

RX1+、RX1-: RS422 differential signal sending receive

15. General of External I/O Unit (X1) Interfaces



16. Connectivity Diagrams for I/O Unit (X1) Input/output Signals

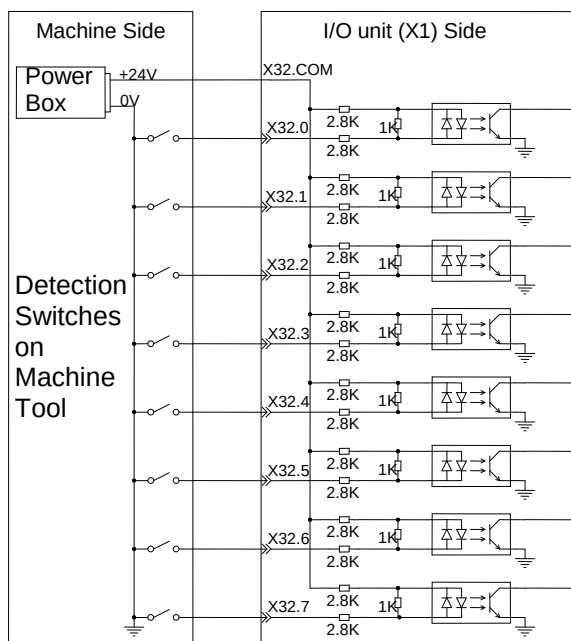
1. Input Signal

The COM ports of each address group determine whether the addresses are valid at high or low level:

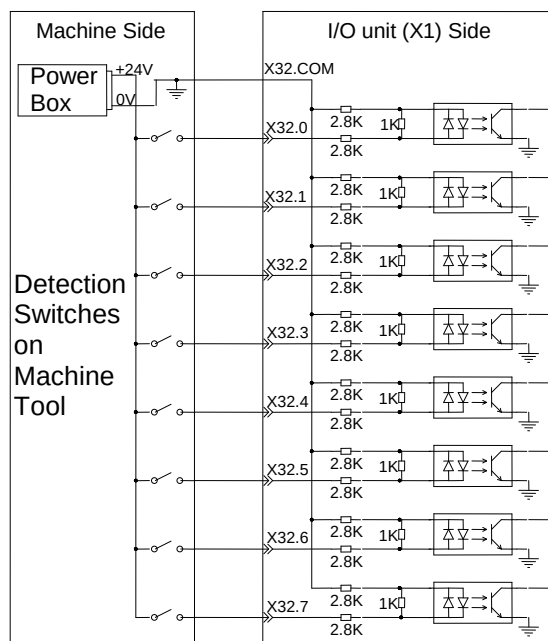
When COM port is connected to 24V, the input points are valid at low level (0V) ;

When COM port is connected to 0V, the input points are valid at low level (24V) .

Connection when low level is valid



Connection when high level is valid

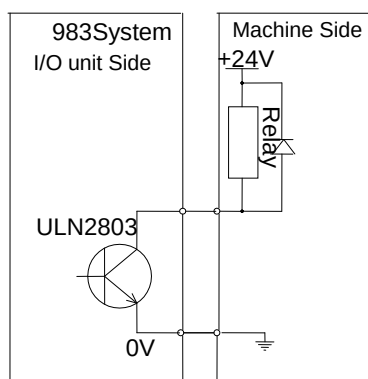


Note: There are 64 input points in 8 different groups. The figure above is taken X32.0-X32.7 for example; other groups are alike.

2. Output Signal

There are 40 points for ULN2803 output. The maximum passing current of each point is 200mA.

Connectivity Diagram of Output Point



17. I/O Points Definition (X1)

Terminal No.	PLC Address	Signal Name	Signal Function	I/O
X32.COM		X32 common port	High/low selection for group X32	
X32.0	X32.0	*+LX (fixed)	X axis " + " direction limit (short it to 0V when unused)	I
X32.1	X32.1	*-LX (fixed)	X axis " - " direction limit (short it to 0V when unused)	I
X32.2	X32.2			I
X32.3	X32.3			I
X32.4	X32.4			I
X32.5	X32.5	*DECX (fixed)	X axis zero-point return deceleration	I
X32.6	X32.6			I
X32.7	X32.7			I
X33.COM		X33 common port	High/low selection for group X33	
X33.0	X33.0	*+LZ (fixed)	Z axis " + " direction limit (short it to 0V when unused)	I
X33.1	X33.1	*-LZ (fixed)	X axis " - " direction limit (short it to 0V when unused)	I
X33.2	X33.2			I
X33.3	X33.3			I
X33.4	X33.4			I
X33.5	X33.5	*DECZ (fixed)	Z axis zero-point return deceleration	I
X33.6	X33.6			I
X33.7	X33.7			I
X34.COM		X34 common port	High/low selection for group X34	
X34.0	X34.0			I
X34.1	X34.1			I
X34.2	X34.2			I
X34.3	X34.3			I
X34.4	X34.4			I
X34.5	X34.5			I
X34.6	X34.6			I
X34.7	X34.7			I
X38.COM		X38 common port	High/low selection for group X38	
X38.0	X38.0			I
X38.1	X38.1			I
X38.2	X38.2			I
X38.3	X38.3			I
X38.4	X38.4	*ESP (fixed)	Emergency stop (input)	I
X38.5	X38.5			I
X38.6	X38.6			I
X38.7	X38.7			I

Terminal No.	PLC Address	Signal Name	Signal Function	I/O
X48.COM		X48 common port	High/low selection for group X48	
X48.0	X48.0			I
X48.1	X48.1			I
X48.2	X48.2			I
X48.3	X48.3			I
X48.4	X48.4			I
X48.5	X48.5			I
X48.6	X48.6			I
X48.7	X48.7			I
X43.COM		X43 common port	High/low selection for group X43	
X43.0	X43.0			I
X43.1	X43.1			I
X43.2	X43.2			I
X43.3	X43.3			I
X43.4	X43.4			I
X43.5	X43.5			I
X43.6	X43.6	SKIP.M	Block skip signal input	I
X43.7	X43.7			I
X35.COM		X35 common port	High/low selection for group X35	
X35.0	X35.0			I
X35.1	X35.1			I
X35.2	X35.2			I
X35.3	X35.3			I
X35.4	X35.4			I
X35.5	X35.5			I
X35.6	X35.6			I
X35.7	X35.7			I
X40.COM		X40 common port	High/low selection for group X40	
X40.0	X40.0			I
X40.1	X40.1			I
X40.2	X40.2			I
X40.3	X40.3	XAG.M	X axis auto tool compensation	I
X40.4	X40.4	ZAG.M	Z axis auto tool compensation	I
X40.5	X40.5			I
X40.6	X40.6			I
X40.7	X40.7			I

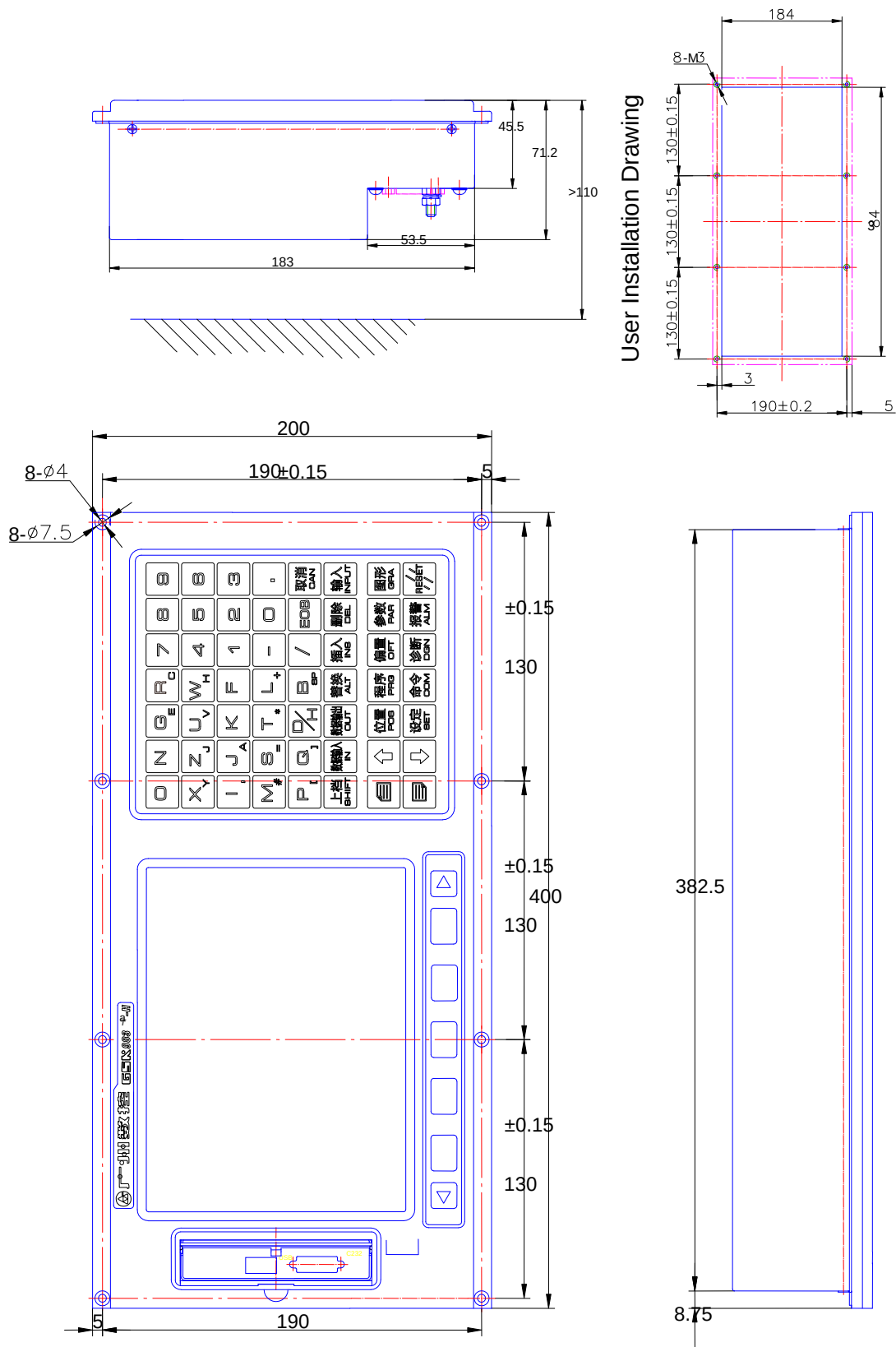
Terminal No.	PLC Address	Signal Name	Signal Function	I/O
Y0.0	Y0.0			O
Y0.1	Y0.1			O
Y0.2	Y0.2			O
Y0.3	Y0.3			O
Y0.4	Y0.4			O
Y0.5	Y0.5			O
Y0.6	Y0.6			O
Y0.7	Y0.7			O
Y1.0	Y1.0			O
Y1.1	Y1.1			O
Y1.2	Y1.2			O
Y1.3	Y1.3			O
Y1.4	Y1.4			O
Y1.5	Y1.5			O
Y1.6	Y1.6			O
Y1.7	Y1.7			O
Y2.0	Y2.0			O
Y2.1	Y2.1			O
Y2.2	Y2.2			O
Y2.3	Y2.3			O
0V			24V power ground	
+24V			24V power output	O

Terminal No.	PLC Address	Signal Name	Signal Function	I/O
Y3.0	Y3.0			O
Y3.1	Y3.1			O
Y3.2	Y3.2			O
Y3.3	Y3.3			O
Y3.4	Y3.4			O
Y3.5	Y3.5			O
Y3.6	Y3.6			O
Y3.7	Y3.7			O
Y6.0	Y6.0			O
Y6.1	Y6.1			O
Y6.2	Y6.2			O
Y6.3	Y6.3			O
Y6.4	Y6.4			O
Y6.5	Y6.5			O
Y6.6	Y6.6			O
Y6.7	Y6.7			O
Y2.4	Y2.4			O
Y2.5	Y2.5			O

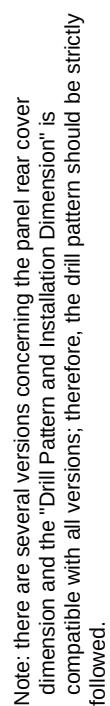
Y2.6	Y2.6			O
Y2.7	Y2.7			O
0V			24V power ground	
+24V			24V power output	O

Note: Those points which have been defined functions are fixed in the system that cannot be changed any more by users. And functions of other points can be programmed by PLC.

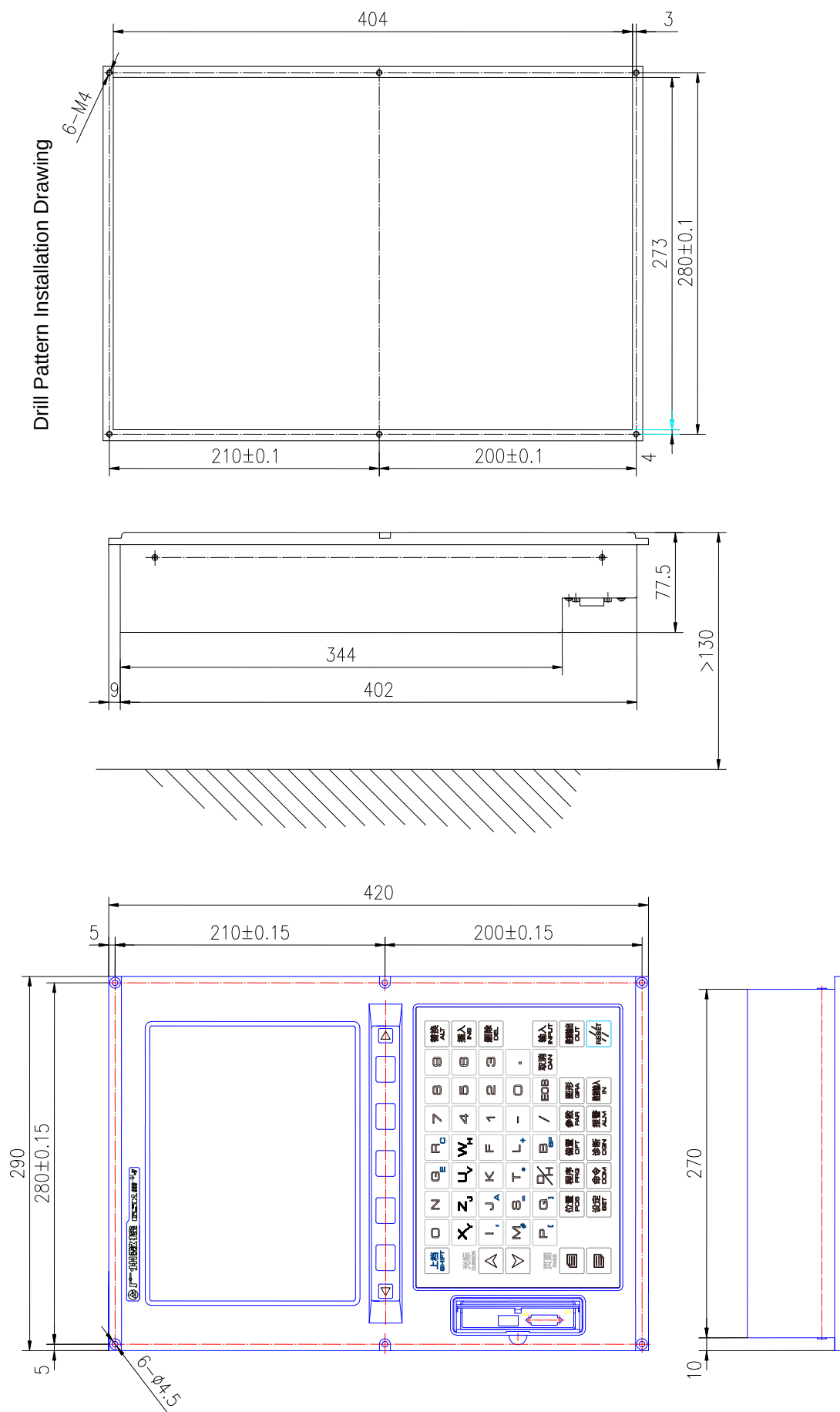
Appendix 1 Installation Dimension Drawings



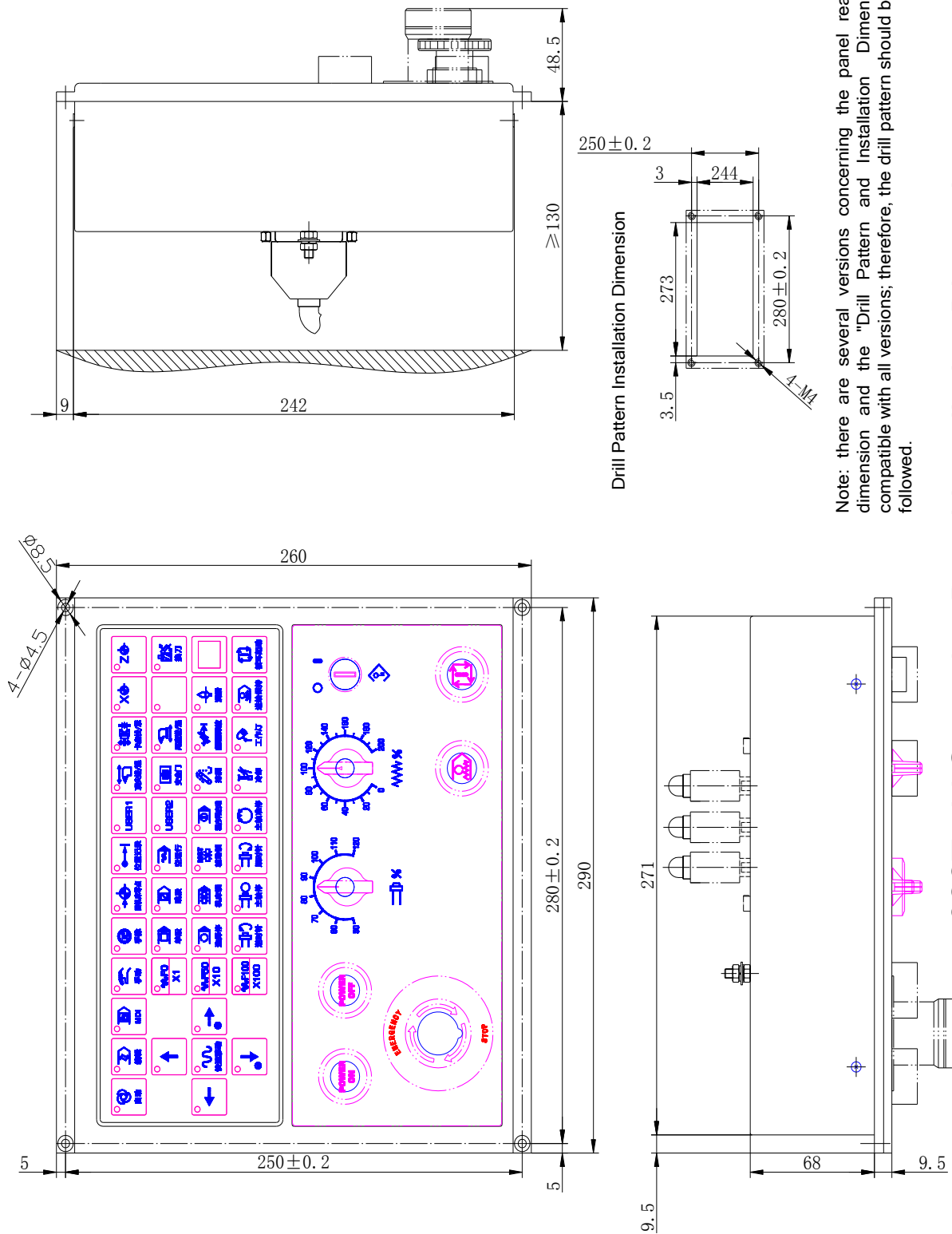
983Ta-H NC Unit Installation Dimension



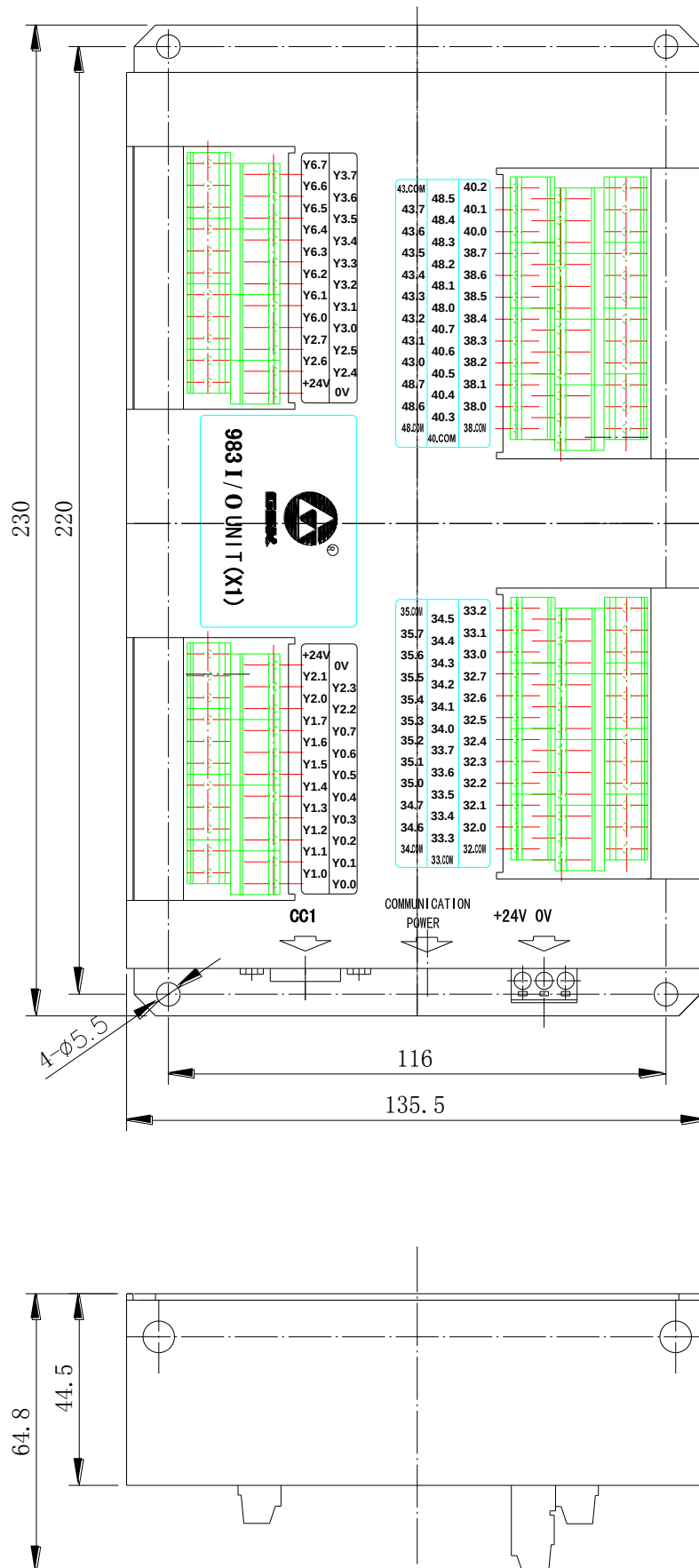
983Ta-H Operation Panel Installation Dimension



983Ta-V NC Unit Installation Dimension

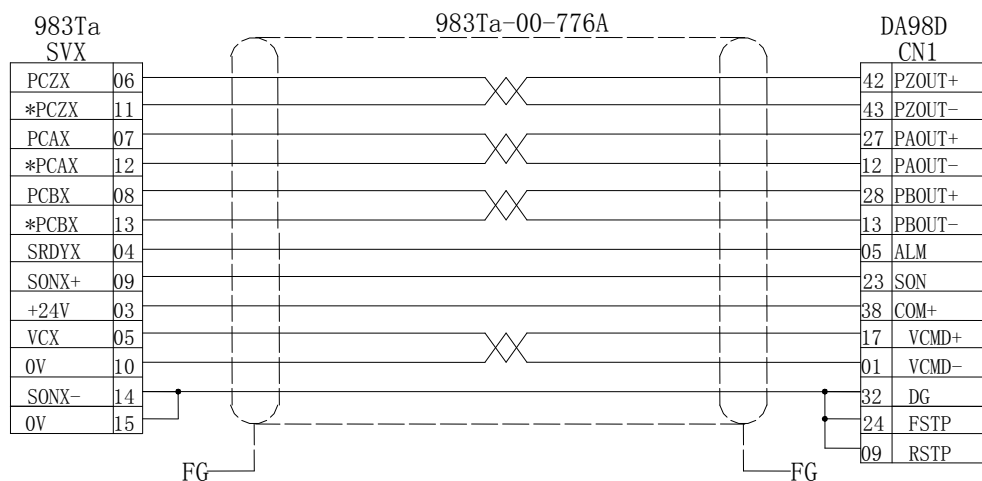
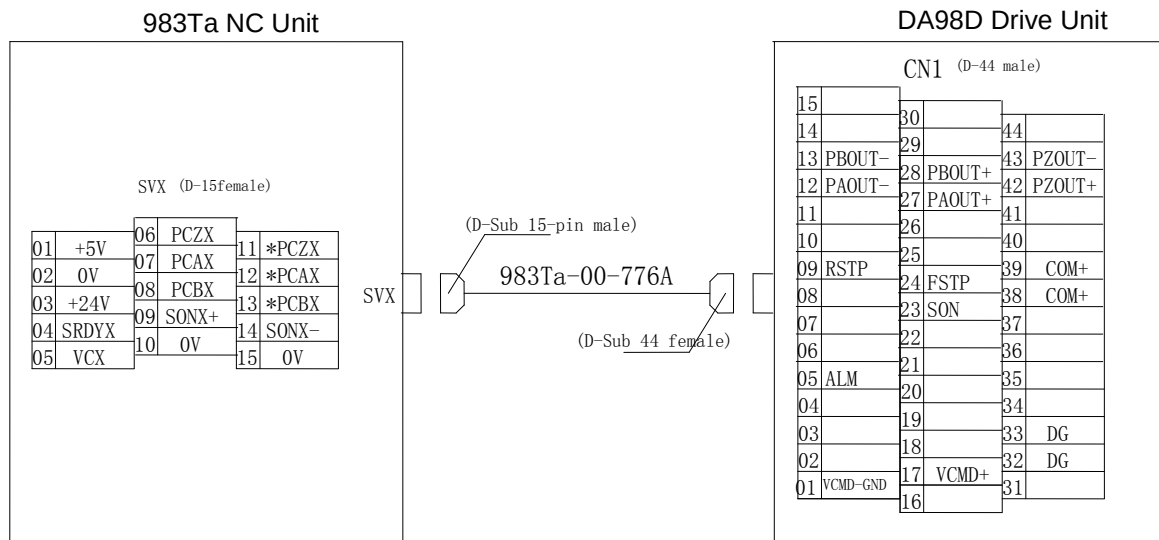


Note: there are several versions concerning the panel rear cover dimension and the "Drill Pattern and Installation Dimension" is compatible with all versions; therefore, the drill pattern should be strictly followed.



Appendix 2 Connection between NC Unit and DA98D Drive Unit (obsolete product)

Connection without brake

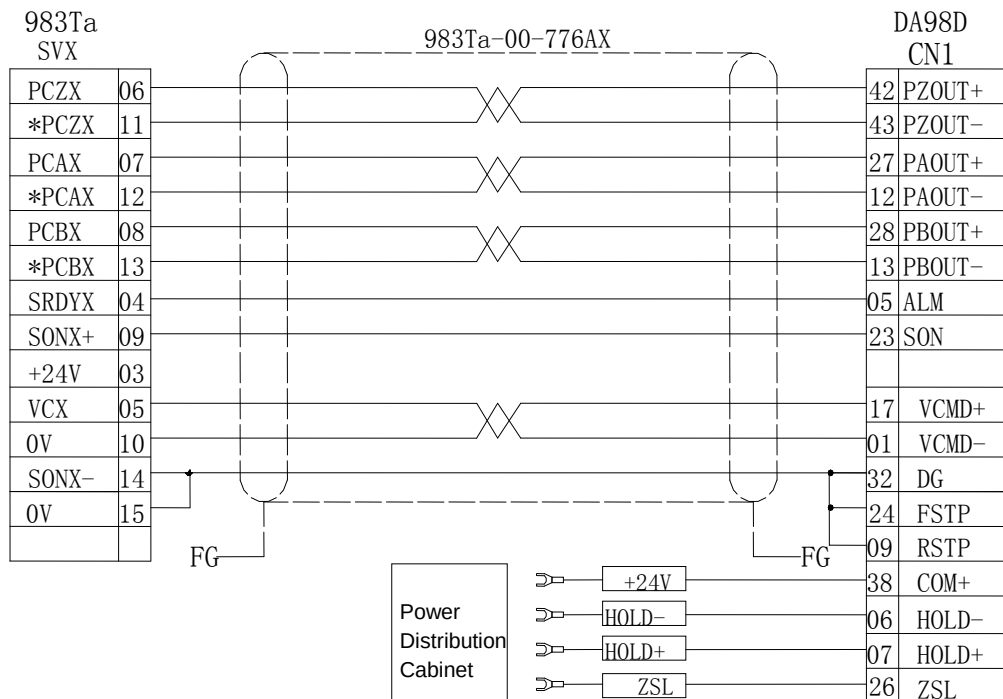
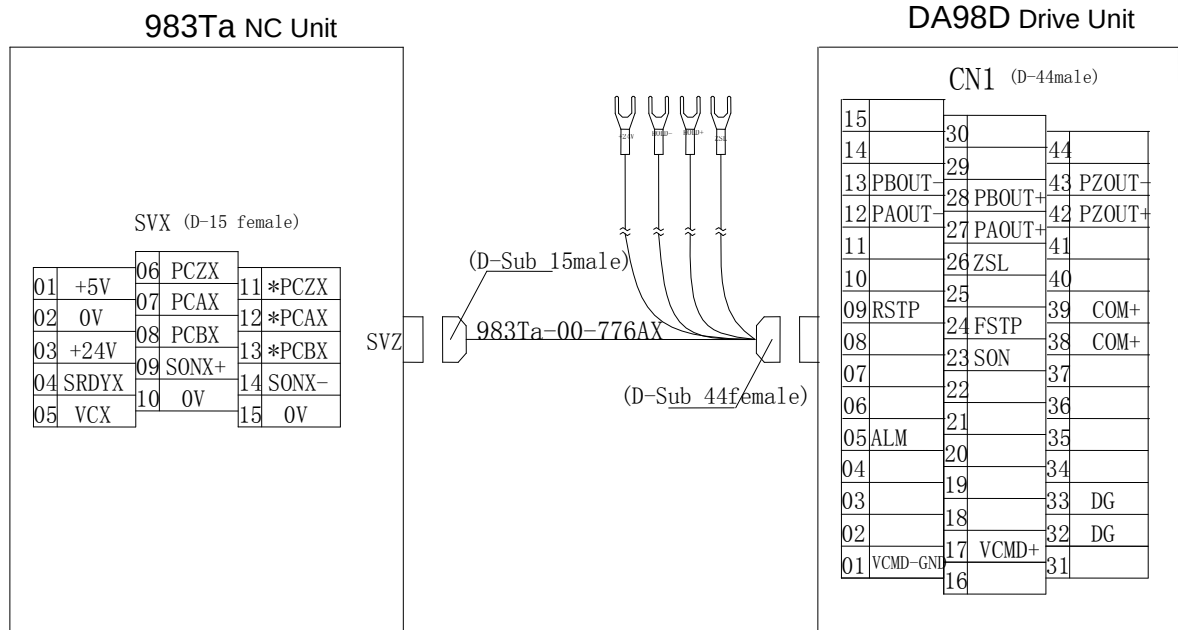


PCAX *PCAX: Encoder feedback A phase differential signal(pulse signal, drive→NC)
 PCBX *PCBX: Encoder feedback B phase differential signal(pulse signal, drive→NC)
 PCZX *PCZX: Encoder feedback Z phase differential signal(pulse signal, drive→NC)
 SONX+/-: Enable signal(switch signal,NC→drive)
 ALMX: alarm signal (switch signal, drive→NC)
 VCX: Speed control voltage (direct voltage, NC→drive)

Note 1: When X axis is not with brake, the connection of X or Z axis is the same. Connection of X axis with brake, please see to the following page. .

Note 2: According to this connection method, the rotation direction of the motor is consistent with Cartesian coordinate system, that is ,seen from motor axle head, the feeding direction is positive direction. If the converse direction is needed, set PA46 parameter of DA98D to 3(Default value is "0").

Connection without brake



GSK983Ta-H/ GSK983Ta- V Turning CNC System Connection Manual

Version Upgrading Records

No.	Date	Version	Content
1	2012-6-19	First Version	